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| 10/817,539      | 04/02/2004  | Gary L. Bush         | GLB002              | 2517             |

7590 03/05/2007  
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| EXAMINER |
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SUERETH, SARAH ELIZABETH

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| ART UNIT | PAPER NUMBER |
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3749

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE  | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS                               | 03/05/2007 | PAPER         |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/817,539

Applicant(s)

BUSH, GARY L.

Examiner

Sarah Suereth

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-10,12-22,27-29,31-37,39-49,54 and 56-62 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.

- 6) ☒ Claim(s) 1-3,5-10,12-22,27-29,31-37,39-49,54 and 56-62 is/are rejected.

- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.

- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. Receipt of applicant's amendment filed on 12/20/06 is acknowledged.

### ***Information Disclosure Statement***

2. The information disclosure statement filed 9/06/06 fails to comply with 37 CFR 1.98(a)(1), which requires the following: (1) a list of all patents, publications, applications, or other information submitted for consideration by the Office; (2) U.S. patents and U.S. patent application publications listed in a section separately from citations of other documents; (3) the application number of the application in which the information disclosure statement is being submitted on each page of the list; (4) a column that provides a blank space next to each document to be considered, for the examiner's initials; and (5) a heading that clearly indicates that the list is an information disclosure statement. The information disclosure statement has been placed in the application file, but the information referred to therein has not been considered.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
4. Claims 1, 2, 5, 6, 8-10, 12, 14, 15-18, 27, 28, 31, 32, 34-36, 39, and 41-45, 54, 58, 60-62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (3976726) in view of Kita (5829420).

Johnson discloses: initiating a combustion reaction of a combustion material (col. 1, line 45), stimulating one or more components using nuclear resonance (col. 1, lines 28, 29), to alter the oxidation of one or more components of the combustion reaction (col. 1, lines 7, 8).

Regarding the limitation "the nuclear resonance stimulation having a frequency targeted for one or more selected components", Johnson teaches that the frequency is selected to target either molecular components or separate elemental compositions (col. 1, lines 33-37).

Johnson also discloses: a combustion chamber (col. 2, line 11), an intake (col. 2, line 21), and an exhaust port (col. 3, line 14).

Regarding claim 2, the stimulation uses nuclear magnetic resonance (col. 3, line 25).

Regarding claim 5 and 31, Johnson teaches the stimulation can occur during combustion (see "activated at time of reaction", col. 1, lines 45-48 and "at the combustion chamber" col. 3, lines 62,63).

Regarding claim 6 and 32, the stimulating can occur before the combustion reaction, in an intake (col. 1, lines 45,46).

Regarding claims 8-9, 34-35,43, Johnson discloses emitting an electromagnetic signal (col. 2, line 45), targeting the nuclear resonance frequency of the combustion (col. 2, lines 28-30), specifically for hydrogen (col. 3, line 40) and nitrogen (col. 3, lines 65,66).

Regarding claims 10, 36 and 44, the pulse is synchronized with the initiating of the combustion reaction (col. 1, lines 45,46).

Johnson, as discussed above, discloses the invention as claimed with the exception of adjusting the frequency of the nuclear resonance stimulation based on sensed operating parameters. Johnson discloses varying the frequency using oscillators (col. 1, lines 54-56), but does not mention varying the frequency via a feedback loop.

Kita discloses: several inputs (12,14) for receiving sensory data relating to the combustion reaction (col. 5, lines 51-53), control logic (10) which examines the sensory data to determine an operational adjustment factor for a magnetic field (16), and an output which provides a signal indicative of the operational adjustment factor (col. 7, lines 1,2).

Kita, as discussed above, discloses adjusting the intensity of a magnetic field based on sensed parameters, using a feedback control loop.

Regarding claims 12 and 39, Kita discloses an exhaust gas sensor that monitors for carbon dioxide, and the controller varies the intensity of the magnetic field based on the sensor readings (col. 5, lines 1-3).

Regarding claims 14 and 41, Kita discloses adjusting the intensity of the magnetic field by using data previously recorded (col. 5, lines 24-26).

Regarding claim 58, Kita discloses an exhaust gas sensor that monitors for carbon dioxide, and the controller varies the strength of the magnetic field based on the sensor readings (col. 5, lines 1-3).

Regarding claim 60, Kita discloses adjusting the nuclear resonance stimulation source by using data previously recorded (col. 5, lines 24-26).

As discussed above, Johnson teaches the importance of varying the frequency to achieve the desired results. Kita teaches using a feedback loop in a similar environment to obtain optimal results.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Johnson apparatus by adding feed back control as taught by Kita, in order to reduce emissions and improve fuel economy (Kita, col. 2, lines 16,17).

Regarding claims 15-18, and 41-45, Johnson discloses that the stimulation should preferably be done "just before combustion" (col. 1, lines 45,46), without showing

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a specific time frame. Applicant discloses in the specification that the resonance relaxation time is 1 second for NMR substances and .001 seconds for NQR substances (page 5, line 8).

The courts have held when the general conditions are known in the prior art, it is not inventive to determine the optimal conditions, unless new and unexpected results occur with that range. Applicant has not demonstrated criticality for the claimed times, and has not shown how they produce different results from the prior art methods. (See *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955), MPEP 2144.05).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Johnson in view of Kita apparatus by ensuring the activation time was less than 1 second before combustion in order to activate the fuel while it had the optimal amount of energy.

Regarding claims 61 and 62, Johnson discloses stimulating both hydrogen and nitrogen to their resonant frequencies (col. 3, lines 40,65-68), but does not disclose doing both simultaneously, with two sources.

However, the courts have held that duplication of parts for amplified effect does not distinguish over the prior art, unless a new and unexpected result is produced (*In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960) , also MPEP 2144.04).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Johnson apparatus by using two stimulation sources, in order to stimulate both elements more quickly.

5. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (3976726) in view of Kita (5829420), further in view of Schleifstein et al (6533963).

As discussed above, Johnson in view of Kita discloses the claimed invention with the exception of electromagnetic shielding inside the combustion chamber.

Schleifstein teaches that it is well known to use a reflective shield to contain electromagnetic waves, in order to shield other systems or equipment from the electromagnetic field (col. 1, lines 44-48).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Johnson in view of Kita apparatus by placing a reflective shield inside the combustion chamber as taught by Schleifstein, in order to shield the other components from the electromagnetic field (col. 1, lines 44-48).

6. Claims 3, 7, 19-22, 29, 33, 46-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (3976726) in view of Kita (5829420), and further in view of Smith.

The Johnson in view of Kita combination discloses the claimed invention with the exception of teaching a nuclear magnetic resonance source (NMR) instead of a nuclear quadruple resonance source (NQR).

Johnson discloses treating nitrogen with an NMR source (col. 3, lines 65,66).

Smith discloses that both NQR and NMR work to chemically identify specimens, but NQR is preferred because it does not require a magnetic field (col. 2, lines 8,9).



It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Johnson in view of Kita apparatus by replacing the NMR source with an NQR source as taught by Smith in order to use the device in an area where a magnetic field is not desired (col. 2, lines 8,9).

7. Claims 13, 40, 54-57 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson (3976726) in view of Monette et al (U.S. Patent Number 6971376, also published as WO2004/025110).

Johnson, as discussed above, discloses the claimed invention with the exception of using temperature conditions in the exhaust to adjust the frequency.

For simplicity, the Monette columns and lines cited below are referenced from the U.S. Patent Publication.

Monette discloses: an input for receiving sensory data relating to the combustion reaction (col. 5, line 29), control logic (U1) which examines the sensory data to determine an operational adjustment factor source, and an output which provides a signal indicative of the operational adjustment factor, and adjusts the frequency accordingly (col. 5, lines 38-40).

Monette discloses a nuclear resonance stimulation source (14) emitting an electromagnetic signal having a beginning frequency (col. 2, lines 50,51), and the controller (U1) adjusts the beginning frequency for the signal (col. 5, lines 38-40).

Regarding claim 56, the beginning frequency can be programmably set (col. 5, lines 33-35).

Regarding claim 57, Monette discloses varying the magnitude of the frequency step adjustment by using an oscillator (col. 5, lines 1-3). Various embodiments of Figure 3 show different circuit configurations, established to vary the frequency increments. These Figures read on the claimed step of "allowing a frequency adjustment value to be programmably set", because choosing the desired circuit will result in the desired frequency step.

Regarding claim 59, the controller adjusts the beginning frequency based on the temperature information (col. 5, lines 38-40).

Monette, as discussed above, discloses that the controller adjusts the beginning frequency based on the temperature information (col. 5, lines 38-40).

Regarding claims 13, 40 and 59, the claims only require that the controller receives sensory data that "relates to" information on a temperature in an exhaust stream. Although the sensor in Monette is designed to receive ambient temperature data, variations in this sensed temperature obviously relate to variations in the exhaust stream.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Johnson apparatus with the controller of Monette in order to allow the system to be easily adapted to various environments (col. 5, lines 33,34).

### ***Response to Arguments***

8. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections

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are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208

USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir.

1986). Johnson teaches using NMR, and varying the frequencies. Applicant has stated

that NMR requires both a static and an oscillating magnetic field (see arguments, page

16 lines 4-8). Johnson does not explicitly state that the oscillating field is adjusted.

However, Kita teaches using a feedback loop in a similar environment to provide quick

adjustments to an oscillating magnetic field. The fact that Kita does not mention NMR

does not make adding feedback to the Johnson apparatus nonobvious.

9. In response to applicant's argument that Monette does not show a nuclear resonance stimulation source, the examiner notes that neither NMR nor NQR are specifically claimed in claims 54-60. The examiner believes that the Monette magnetic field is capable of stimulating the nucleus of an atom to nuclear resonance, and thus would properly read on "a nuclear resonance stimulation source". Johnson teaches radio frequency excitation may be applied through a coil structure, with or without a magnetic field (col. 1, lines 51-53). It appears that the Johnson coil structure (15) is equivalent to the Monette coil structure (14), and could perform the desired function of stimulating the nucleus of an atom with an electromagnetic field at the resonant frequency. The fact that Monette prefers lower frequencies than the applicant is not sufficient to show that the Monette apparatus is incapable of working at higher frequencies.

***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarah Suereth whose telephone number is (571) 272-9061. The examiner can normally be reached on Monday to Thursday 7:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Rinehart can be reached on (571) 272-4881. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Sarah Suereth  
Examiner  
Art Unit 3749

  
KENNETH RINEHART  
PRIMARY EXAMINER